CLAIMS

1. An apparatus for encoding data, the apparatus comprising:

a receiving section that receives the data;

a signal-deteriorating factor generation section for generating a signal-deteriorating factor in the received data based on the received data; and

a data-encoding section for obtaining encoded data by performing encoding processing on the data in which the signal-deteriorating factor is generated so that signal deterioration may be promoted in accordance with the signal-deteriorating factor.

2. The apparatus for encoding the data according to claim 1, wherein analog data is received at the receiving section;

wherein the signal-deteriorating factor generation section includes:

an analog-to-digital conversion section for converting the analog data received at the receiving section into digital data; and

a phase-shifting section for shifting a phase of digital data output from the analog-to-digital conversion section; and

wherein the data encoding section has an encoding section for encoding the digital data whose phase is shifted by the phase-shifting section.

3. The apparatus for encoding the data according to claim 2, wherein the analog-to-digital conversion section includes the phase shifting section, to shift a phase of the digital data when the analog-to-digital conversion section converts the analog data into the digital data.

4. The apparatus for encoding the data according to claim 2, the apparatus further comprising:

a decoding section for decoding encoded data output from the encoding section; and

a digital-to-analog conversion section for converting the digital data output from the decoding section into analog data.

5. The apparatus for encoding the data according to claim 2, the apparatus further including a recording section for recording encoded data output from the encoding section on a recording medium.

6. The apparatus for encoding the data according to claim 4, wherein the digital data is image data, and

wherein the apparatus further comprises an image display section for displaying an image due to analog data output from the digital-to-analog conversion section.

7. The apparatus for encoding the data according to claim 4, wherein the digital data is audio data, and

wherein the apparatus further comprises an audio output section for outputting an audio due to analog data output from the digital-to-analog conversion section.

8. The apparatus for encoding the data according to claim 2, wherein the phase-shifting section fixes a shift width of a phase of the digital data.

9. The apparatus for encoding the data according to claim 2, wherein the phase-shifting section randomizes a shift width of a phase of the digital data.

10. The apparatus for encoding the data according to claim 2, wherein the encoding section performs encoding by use of sub-sampling on the digital data.

11. The apparatus for encoding the data according to claim 2, wherein the encoding section performs conversion encoding on the digital data.

12. The apparatus for encoding the data according to claim 2, wherein the encoding section includes:

an extraction section for extracting digital data from a predetermined range of the digital data whose phase is shifted by the phase-shifting section;

a maximum value detection section for detecting a maximum value of the digital data extracted by the extraction section;

a minimum value detection section for detecting a minimum value of the digital data extracted by the extraction section;

a dynamic range detection section for detecting a dynamic range of the digital data extracted by the extraction section, based on the maximum value detected by the maximum value detection section and the minimum value detected by the minimum value detection section;

a generation section for generating minimum value-removed data by subtracting the minimum value detected by the minimum value detection section from the digital data extracted by the extraction section; and

a quantization section for quantizing the minimum value-removed data generated by the generation section, by using a quantization step

determined in accordance with the dynamic range detected by the dynamic range detection section.

13. The apparatus for encoding the data according to claim 12, wherein the quantization section changes the number of quantization bits in accordance with the dynamic range.

14. The apparatus for encoding the data according to claim 2, wherein the encoding section performs data compression encoding on the digital data.

15. The apparatus for encoding the data according to claim 1, wherein digital data is received at the receiving section;

wherein the signal-deteriorating factor generation section includes a phase-shifting section for shifting a phase of the digital data which is received at the receiving section; and

wherein the data encoding section includes an encoding section for encoding the digital data whose phase is shifted by the phase-shifting section.

16. The apparatus for encoding the data according to claim 15, further comprising:

a decoding section for decoding encoded data output from the encoding section; and

a digital-to-analog conversion section for converting the digital data output from the decoding section into analog data.

17. The apparatus for encoding the data according to claim 1, wherein digital data is received at the receiving section;

wherein the data-encoding section includes the signal-deteriorating factor generation section;

wherein the data-encoding section includes:

a first encoding section for encoding the digital data which is received at the receiving section;

a second encoding section for further encoding the digital data encoded by the first encoding section; and

a third encoding section for further encoding the digital data encoded by the second encoding section; and

wherein output data of the first encoding section, the second encoding section, and the third encoding section is deteriorated because the digital data which is received at the receiving section is shifted in phase.

18. The apparatus for encoding the data according to claim 17, wherein the first encoding section performs encoding by use of sub-sampling on the digital data; and

wherein the second encoding section includes:

an extraction section for extracting digital data from a predetermined range of the digital data encoded by the first encoding section;

a maximum value detection section for detecting a maximum value of the digital data extracted by the extraction section;

a minimum value detection section for detecting a minimum value of the digital data extracted by the extraction section;

a dynamic range detection section for detecting a dynamic range of the digital data extracted by the extraction section, based on the maximum value detected by the maximum value detection section and the minimum value detected by the minimum value detection section;

a generation section for generating minimum value-removed data by subtracting the minimum value detected by the minimum value detection section from the digital data extracted by the extraction section; and

a quantization section for quantizing the minimum value-removed data generated by the generation section, by using a quantization step determined in accordance with the dynamic range detected by the dynamic range detection section.

19. The apparatus for encoding the data according to claim 18, wherein the third encoding section performs conversion encoding on the digital data.

20. The apparatus for encoding the data according to claim 1, wherein digital data is received at the receiving section;

wherein the signal-deteriorating factor generation section includes a first encoding section for performing encoding by use of sub-sampling on the digital data which is received at the receiving section; and

wherein the data-encoding section includes a second encoding section for performing conversion encoding on the digital data encoded by the first encoding section.

21. The apparatus for encoding the data according to claim 20, wherein the digital data is image data; and

wherein the first encoding section performs line offset sub-sampling and alternately arranges, for each two consecutive lines, pixel data constituting digital data that corresponds to the two lines, to create new digital data.

22. The apparatus for encoding the data according to claim 1, wherein digital data is received at the receiving section;

wherein the signal-deteriorating factor generation section includes a first encoding section for performing encoding by use of sub-sampling on the digital data which is received at the receiving section;

wherein the data-encoding section includes a second encoding section for further encoding the digital data encoded by the first encoding section; and

wherein the second encoding section includes:

an extraction section for extracting digital data from a predetermined range of the digital data encoded by the first encoding section;

a maximum value detection section for detecting a maximum value of the digital data extracted by the extraction section;

a minimum value detection section for detecting a minimum value of the digital data extracted by the extraction section;

a dynamic range detection section for detecting a dynamic range of the digital data extracted by the extraction section, based on the maximum value detected by the maximum value detection section and the minimum value detected by the minimum value detection section;

a generation section for generating minimum value-removed data by subtracting the minimum value detected by the minimum value detection section from the digital data extracted by the extraction section; and

a quantization section for quantizing the minimum value-removed data generated by the generation section, by using a quantization step determined in accordance with the dynamic range detected by the dynamic range detection section.

23. The apparatus for encoding the data according to claim 22, wherein the digital data is image data; and

wherein the first encoding section performs line offset sub-sampling and alternately arranges, for each two consecutive lines, pixel data constituting digital data that corresponds to the two lines, to create new digital data.

24. The apparatus for encoding the data according to claim 1, wherein digital signal is received at the receiving section;

wherein the signal-deteriorating factor generation section includes a blocking section for performing blocking on the received digital signal accompanied by shuffling in such a predetermined pattern as to reduce a correlation between adjacent items of data; and

wherein the data-encoding section includes a block-encoding section for obtaining an encoded digital signal by performing block encoding on data of each of the blocks obtained by the blocking section.

25. The apparatus for encoding the data according to claim 24, wherein the block-encoding section includes:

an orthogonal transformation section for obtaining a conversion coefficient by performing orthogonal transformation on the data of each of the blocks obtained by the blocking section; and

a quantization section for quantizing the conversion coefficient of each of the blocks from the orthogonal transformation section.

26. The apparatus for encoding the data according to claim 24, wherein the block-encoding section includes:

a maximum value/minimum value detection section for detecting a maximum value and a minimum value of data in a block;

a dynamic range detection section for detecting a dynamic range of the data in the block according to the maximum value and the minimum value detected by the maximum value/minimum value detection section;

a generation section for generating minimum value-removed data by subtracting the minimum value detected by the maximum value/minimum value detection section from the data in the block; and

a quantization section for obtaining an encoded digital signal by quantizing the minimum value-removed data generated by the generation section, by using a quantization step determined in accordance with the dynamic range detected by the dynamic range detection section.

27. The apparatus for encoding the data according to claim 1 further comprising an extraction section for extracting data from a predetermined range of the data received at the receiving section,

wherein the data-encoding section includes:

a maximum value/minimum value detection section for detecting a maximum value and a minimum value of the data extracted by the extraction section;

a dynamic range detection section for detecting a dynamic range of the data extracted by the extraction section, according to the maximum value and the minimum value detected by the maximum value/minimum value detection section;

a generation section for generating minimum value-removed data by subtracting the minimum value detected by the maximum value/minimum value detection section from the data extracted by the extraction section; and

an encoding section for obtaining encoded data by quantizing the minimum value-removed data generated by the generation section, by using a quantization step determined in

accordance with the dynamic range detected by the dynamic range detection section, and

wherein the encoding section includes the signal-deteriorating factor generation section for performing quantization in a condition where a quantization step in at least one of a region on the side of the maximum value and a region on the side of the minimum value is made larger than quantization steps in other regions.

28. The apparatus for encoding the data according to claim 27, wherein the encoding section changes the number of quantization bits according to the dynamic range.

29. The apparatus for encoding the data according to claim 27, further including a number-of-times detection section for detecting a number of times of a maximum value side, which is the number of items of data contained in a predetermined range on the maximum value side, and a number of times of a minimum value side, which is the number of items of data contained in a predetermined range on the minimum value side, based on the data extracted by the extraction section,

wherein the encoding section makes a quantization step in the region on the minimum value side larger than quantization steps in other regions if the number of times of the minimum value side is smaller than the number of times of the maximum value side or makes the quantization step in the region on the maximum value side larger than quantization steps in other regions if the number of times of the maximum value side is smaller than the number of times of minimum value side.

30. The apparatus for encoding the data according to claim 27, further including a decoding section for decoding the encoded data obtained by the encoding section, and a digital-to-analog conversion

section for converting digital data output from the decoding section into analog data.

31. The apparatus for encoding the data according to claim 27, further including a recording section for recording the encoded data output from the encoding section on a recording medium.

32. The apparatus for encoding the data according to claim 30, wherein analog data output from the digital-to-analog conversion section is image data; and

wherein the apparatus further includes an image display section for displaying an image due to the analog data.

33. The apparatus for encoding the data according to claim 30, wherein analog data output from the digital-to-analog conversion section is audio data; and

wherein the apparatus further includes an audio output section for outputting an audio due to the analog data.

34. The apparatus for encoding the data according to claim 1, wherein image data is received at the receiving section,

wherein the apparatus further includes an orthogonal transformation section for obtaining a conversion coefficient by performing orthogonal transformation on image data of each of the blocks obtained by dividing the image data received at the receiving section into two-dimensional blocks and a quantization section for quantizing the conversion coefficient of each of the blocks supplied from the orthogonal transformation section;

wherein the signal-deteriorating factor generation section includes:

a block information generation section for generating block information indicative of a block whose conversion coefficient of a high-range frequency domain is to be removed; and

a range information generation section for generating range information indicative of a range of the high-range frequency domain; and

wherein the data-encoding section includes a conversion coefficient removal section for removing a conversion coefficient of a high-range frequency domain indicated by the range information generated by the range information generation section, in a block indicated by the block information generated by the block information generation section, on the side of an input or an output of the quantization section.

35. The apparatus for encoding the data according to claim 34, wherein the orthogonal transformation is discrete cosine transform.

36. The apparatus for encoding the data according to claim 34, further including a range-varying section for varying a range of the high-range frequency domain.

37. The apparatus for encoding the data according to claim 34, wherein the block to be removed is selected alternately in at least one of horizontal and vertical directions.

38. The apparatus for encoding the data according to claim 34, further including an encoding section for performing variable-length encoding on quantized data in each block from the quantization section.

39. An apparatus for encoding data, the apparatus comprising:

receiving means for receiving the data;

signal-deteriorating factor generation means for generating a signal-deteriorating factor in the received data based on the received data; and

data-encoding means for obtaining encoded data by performing encoding processing on the data in which the signal-deteriorating factor is generated so that signal deterioration may be promoted in accordance with the signal-deteriorating factor.

40. A method for encoding data, the method comprising:

a data-receiving step of receiving the data;

a signal-deteriorating factor generation step of generating a signal-deteriorating factor in the received data based on the received data; and

a data-encoding step of obtaining encoded data by performing encoding processing on the data in which the signal-deteriorating factor is generated so that signal deterioration may be promoted in accordance with the signal-deteriorating factor.

41. The method for encoding the data according to claim 40, wherein analog data is received in the receiving step;

wherein the method further comprises an analog-to-digital conversion step of converting the received analog data into digital data;

wherein the signal-deteriorating factor generation step includes a phase-shifting step of shifting a phase of the converted digital data; and

wherein the data-encoding step includes an encoding step of encoding the digital data whose phase is shifted.

42. The method for encoding the data according to claim 40, wherein digital data is received in the receiving step;

wherein the signal-deteriorating factor generation step includes a phase-shifting step of shifting a phase of the received digital data; and

wherein the data-encoding step includes an encoding step of encoding the digital data whose phase is shifted.

43. The method for encoding the data according to claim 40, wherein digital data is received in the receiving step;

wherein the signal-deteriorating factor generation step includes a blocking step of performing blocking on the received digital signal accompanied by shuffling in such a predetermined pattern as to reduce a correlation between adjacent items of data; and

wherein the data-encoding step includes a block-encoding step of obtaining an encoded digital signal by performing block-encoding on data of each of the blocks obtained by the blocking step.

44. The method for encoding the data according to claim 40, further comprising an extraction step of extracting data from a predetermined range of the received data,

wherein the data-encoding step includes:

a first detection step of detecting a maximum value and a minimum value of the extracted data;

a second detection step of detecting a dynamic range of the extracted data based on the detected maximum value and minimum value;

a generation step of generating minimum value-removed data by subtracting the detected minimum value from the extracted data; and

an encoding step of obtaining encoded data by quantizing the generated minimum value-removed data in a quantization step determined in accordance with the detected dynamic range; and

wherein the encoding step includes the signal-deteriorating factor generation step of performing quantization in a condition where a quantization step in at least one of regions on the maximum value side and the minimum value side is made larger than quantization steps in other regions.

45. The method for encoding the data according to claim 40, wherein image data is received in the receiving step;

wherein the method further comprises:

an orthogonal transformation step of obtaining a conversion coefficient by performing orthogonal transformation on the image data of each of the blocks obtained by dividing the received image data into two-dimensional blocks; and

a quantization step of quantizing the conversion coefficient of each of the blocks obtained by the orthogonal transformation step;

wherein the signal-deteriorating factor generation step includes:

a block information generation step of generating block information indicative of a block whose conversion coefficient of a high-range frequency domain is to be removed; and

a range information generation step of generating range information indicative of a range of the high-range frequency domain; and

wherein the data-encoding step includes a conversion coefficient removal step of removing a conversion coefficient of a high-range frequency domain indicated by the range information generated by the range

information generation step, in a block indicated by the block information generated by the block information generation step, before or after the quantization is performed in the quantization step.

46. An apparatus for encoding data, the apparatus comprising:

an receiving section that receives data into which a signal-deteriorating factor for deteriorating a signal is generated, the factor being generated by a signal-deteriorating factor generation section for generating the factor; and

a data-encoding section that obtains encoded data by performing encoding processing on the data into which the signal-deteriorating factor is generated so that signal deterioration may be promoted in accordance with the signal-deteriorating factor.

47. The apparatus for encoding the data according to claim 46, wherein the receiving section receives a second digital signal that is obtained by sequentially performing encoding processing, decoding processing, digital-to-analog conversion processing that generates analog distortion, and analog-to-digital conversion processing on a first digital signal;

wherein the data-encoding section includes an encoding section for obtaining an encoded digital signal by performing encoding processing on the second digital signal which the receiving section receives; and

wherein a decoded digital signal obtained by decoding an encoded digital signal obtained by the encoding section has a larger degree of deterioration than a decoded digital signal obtained by performing encoding processing and decoding processing on the first digital signal.

48. The apparatus for encoding the data according to claim 47, wherein the encoding section includes:

a blocking section for blocking the second digital signal; and

a block-encoding section for obtaining an encoded digital signal by performing block encoding on data of each of the blocks obtained by the blocking section.

49. The apparatus for encoding the data according to claim 48, wherein the blocking is accompanied by shuffling in such a predetermined pattern as to reduce a correlation between items of data of adjacent positions contained in each of the blocks.

50. The apparatus for encoding the data according to claim 49, wherein the blocking is performed with items of data that are separate from the second digital signal by as much as a predetermined number thereof being made one block.

51. The apparatus for encoding the data according to claim 49, wherein the blocking is accompanied by such shuffling as to reshuffle at least one suite of items of data in a block.

52. The apparatus for encoding the data according to claim 48, wherein the block-encoding section includes:

an orthogonal transformation section for obtaining a conversion coefficient by performing orthogonal transformation on data of each of the blocks obtained by the blocking section; and

a quantization section for quantizing the conversion coefficient of each of the blocks from the orthogonal transformation section.

53. The apparatus for encoding the data according to claim 52, wherein the orthogonal transformation is discrete cosine transform.

54. The apparatus for encoding the data according to claim 52, wherein the orthogonal transformation is discrete sine transform.

55. The apparatus for encoding the data according to claim 52, wherein the orthogonal transformation is wavelet transform.

56. The apparatus for encoding the data according to claim 48, wherein the block-encoding section includes:

a maximum value/minimum value detection section for detecting a maximum value and a minimum value of data in a block;

a dynamic range detection section for detecting a dynamic range of the data in the block according to the maximum value and the minimum value detected by the maximum value/minimum value detection section;

a generation section for generating minimum value-removed data by subtracting the minimum value detected by the maximum value/minimum value detection section from the data in the block; and

an encoding section for obtaining an encoded digital signal by quantizing the minimum value-removed data generated by the generation section, by using a quantization step determined in accordance with the dynamic range detected by the dynamic range detection section.

57. The apparatus for encoding the data according to claim 47, wherein the analog distortion occurs when a high-frequency component is removed in the digital-to-analog conversion.

58. The apparatus for encoding the data according to claim 47, wherein the analog distortion occurs when a signal is shifted in phase in the digital-to-analog conversion.

59. The apparatus for encoding the data according to claim 47, wherein the digital signal is a digital image signal.

60. The apparatus for encoding the data according to claim 47, wherein the digital signal is a digital audio signal.

61. A apparatus for encoding data, the apparatus comprising:

receiving means for receiving data into which a signal-deteriorating factor for deteriorating a signal is generated, the factor being generated by a signal-deteriorating factor generation section for generating the factor; and

data-encoding means for obtaining encoded data by performing encoding processing on the data into which the signal-deteriorating factor is generated so that signal deterioration may be promoted in accordance with the signal-deteriorating factor.

62. A method for encoding data, the method comprising:

a receiving step of receiving data into which a signal-deteriorating factor for deteriorating a signal is generated, the factor being generated by a signal-deteriorating factor generation section for generating the factor; and

a data-encoding step of obtaining encoded data by performing encoding processing on the data into which the signal-deteriorating factor is generated so that signal deterioration may be promoted in accordance with the signal-deteriorating factor.

63. The method for encoding the data according to claim 62, wherein in the receiving step, a second digital signal is received which is obtained by sequentially performing encoding processing, decoding processing, digital-to-analog conversion processing that generates analog

distortion and analog-to-digital conversion processing on a first digital signal;

wherein the data encoding step includes an encoding step of obtaining an encoded digital signal by performing encoding processing on the second digital signal which is received in the input step; and

wherein a decoded digital signal obtained by decoding an encoded digital signal obtained by the encoding step has a larger degree of deterioration than a decoded digital signal obtained by performing encoding processing and decoding processing on the first digital signal.

64. An apparatus for outputting data, the apparatus comprising:

a data output section that outputs encoded digital data;

a data decoding section that obtains decoded data by decoding the output digital data;

a synchronization signal generation section that generates a synchronization signal corresponding to the decoded data;

a signal-deteriorating factor generation section that generates a signal-deteriorating factor promoting signal deterioration into the decoded data according to the decoded data; and

a synthesis section that synthesizes data output from the signal-deteriorating factor generation section and the synchronization signal generated by the synchronization signal generation section.

65. The apparatus for outputting data according to claim 64, wherein the signal-deteriorating factor generation section includes a phase-shifting section for shifting a phase of the synchronization signal generated by the synchronization signal generation section and a phase of the digital data output from the decoding section with respect to each other; and

wherein the synthesis section synthesizes the synchronization signal whose phase is shifted respectively by the phase shifting section and the digital data.

66. The apparatus for outputting data according to claim 65, wherein the data output section reproduces the digital data from a recording medium and outputs it.

67. The apparatus for outputting data according to claim 65, further comprising a digital-to-analog conversion section for converting the digital data output from the synthesis section into analog data.

68. The apparatus for outputting data according to claim 65, wherein the phase shifting section fixes a shift width of the phase.

69. The apparatus for outputting data according to claim 65, wherein the phase shifting section randomizes a shift width of the phase.

70. The apparatus for outputting data according to claim 65, wherein the encoded digital data is digital data obtained by performing encoding by use of sub-sampling.

71. The apparatus for outputting data according to claim 65, wherein the encoded digital data is digital data obtained by performing conversion encoding.

72. The apparatus for outputting data according to claim 65, wherein the encoded digital data is digital data obtained in the encoding section by performing encoding; and

wherein the encoding section includes:

an extraction section for extracting digital data from a predetermined range in digital data before being encoded;

a maximum value detection section for detecting a maximum value of the digital data extracted by the extraction section;

a minimum value detection section for detecting a minimum value of the digital data extracted by the extraction section;

a dynamic range detection section for detecting a dynamic range of the digital data extracted by the extraction section, based on the maximum value detected by the maximum value detection section and the minimum value detected by the minimum value detection section;

a generation section for generating minimum value-removed data by subtracting the minimum value detected by the minimum value detection section from the digital data extracted by the extraction section; and

a quantization section for quantizing the minimum value-removed data generated by the generation section, by using a quantization step determined in accordance with the dynamic range detected by the dynamic range detection section.

73. An apparatus for outputting data, the apparatus comprising:

data output means for outputting encoded digital data;

data decoding means for obtaining decoded data by decoding the output digital data;

synchronization signal generation means for generating a synchronization signal corresponding to the decoded data;

signal-deteriorating factor generation means for generating a signal-deteriorating factor that promotes signal deterioration into the decoded data according to the decoded data; and

synthesis means for synthesizing data output from the signal-deteriorating factor generation means and the synchronization signal generated by the synchronization signal generation means.

74. A method for outputting data, the method comprising:

a data output step of outputting encoded digital data;

a data decoding step of obtaining decoded data by decoding the output digital data;

a synchronization signal generation step of generating a synchronization signal corresponding to the decoded data;

a signal-deteriorating factor generation step of generating a signal-deteriorating factor that promotes signal deterioration into the decoded data according to the decoded data; and

a synthesis step of synthesizing data in which the signal-deteriorating factor is generated and the synchronization signal.

75. The apparatus for outputting data according to claim 74, wherein the signal-deteriorating factor generation step includes a phase-shifting step of shifting a phase of the generated synchronization signal and a phase of the digital data obtained by decoding with respect to each other; and

wherein the synthesis step synthesizes the synchronization signal and the digital data whose phases are shifted respectively.

76. A system for processing a signal comprising:

a receiving section that receives encoded data;

a data-decoding section that obtains decoded data by performing decoding processing on the received encoded data;

a signal-deteriorating factor generation section that generates a signal-deteriorating factor in the decoded data in accordance with the decoded data; and

a data-encoding section that obtains encoded data by performing encoding processing on the data in which the signal-deteriorating factor is generated so that signal deterioration may be promoted in accordance with the signal-deteriorating factor.

77. The system for processing the signal according to claim 76, wherein the encoded data received at the receiving section is an encoded digital signal and the data-decoding section obtains a decoded digital signal by performing decoding processing on the encoded digital signal;

wherein the signal-deteriorating factor generation section includes:

a digital-to-analog conversion section for obtaining an analog signal containing analog distortion by performing digital-to-analog conversion processing on the decoded digital signal obtained by the data-decoding section; and

an analog-to-digital conversion section for obtaining a digital signal by performing analog-to-digital conversion processing on the analog signal obtained by the digital-to-analog conversion section;

wherein the data-encoding section includes an encoding section for obtaining an encoded digital signal by performing encoding processing on the digital signal obtained by the analog-to-digital conversion section; and

wherein the encoding processing performed by the encoding section promotes deterioration in the encoded digital signal owing to an influence of the analog distortion on the digital signal.

78. A system for processing a signal comprising:

receiving means for receiving encoded data;

data-decoding means for obtaining decoded data by performing decoding processing on the received encoded data;

signal-deteriorating factor generation means for generating a signal-deteriorating factor in the decoded data in accordance with the decoded data; and

data-encoding means for obtaining encoded data by performing encoding processing on the data in which the signal-deteriorating factor is generated so that signal deterioration may be promoted in accordance with the signal-deteriorating factor.

79. An apparatus for processing a signal, the apparatus comprising:

a receiving section that receives encoded data;

a data-decoding section that obtains decoded data by performing decoding processing on the received encoded data;

a signal-deteriorating factor generation section that generates a signal-deteriorating factor in the decoded data in accordance with the decoded data; and

a data encoding section that obtains encoded data by performing encoding processing on the data in which the signal-deteriorating factor is generated so that signal deterioration may be promoted in accordance with the signal-deteriorating factor.

80. The apparatus for processing the signal according to claim 79, wherein the encoded data that is received at the receiving section is an encoded digital signal and the data-decoding section obtains a decoded digital signal by performing decoding processing on the encoded digital signal;

wherein the signal-deteriorating factor generation section includes:

a digital-to-analog conversion section for obtaining an analog signal containing analog distortion by performing digital-to-analog conversion processing on the decoded digital signal obtained by the data-decoding section; and

an analog-to-digital conversion section for obtaining a digital signal by performing analog-to-digital conversion processing on the analog signal obtained by the digital-to-analog conversion section;

wherein the data-encoding section includes an encoding section for obtaining an encoded digital signal by performing encoding processing on the digital signal obtained by the analog-to-digital conversion section; and

wherein the encoding processing performed by the encoding section promotes deterioration in the encoded digital signal owing to an influence of the analog distortion on the digital signal.

81. The apparatus for processing the signal according to claim 80, wherein the encoding section includes:

a blocking section for blocking the digital signal obtained by the analog-to-digital conversion section; and

a block-encoding section for obtaining an encoded digital signal by performing block encoding on data of each of blocks obtained by the blocking section.

82. The apparatus for processing the signal according to claim 81, wherein the blocking is accompanied by shuffling in such a predetermined pattern as to reduce a correlation between items of data of adjacent positions contained in each of the blocks.

83. The apparatus for processing the signal according to claim 82, wherein the blocking is performed with items of data that are separate from the digital signal obtained by the analog-to-digital conversion section by as much as a predetermined number thereof being made one block.

84. The apparatus for processing the signal according to claim 82, wherein the blocking is accompanied by such shuffling as to reshuffle at least one suite of items of data in a block.

85. The apparatus for processing the signal according to claim 81, wherein the block-encoding section includes:

an orthogonal transformation section for obtaining a conversion coefficient by performing orthogonal transformation on data of each of the blocks obtained by the blocking section; and

a quantization section for quantizing the conversion coefficient of each of the blocks from the orthogonal transformation section.

86. The apparatus for processing the signal according to claim 81, wherein the block-encoding section includes:

a maximum value/minimum value detection section for detecting a maximum value and a minimum value of data in a block;

a dynamic range detection section for detecting a dynamic range of the data in the block according to the maximum value and the minimum value detected by the maximum value/minimum value detection section;

a generation section for generating minimum value-removed data by subtracting the minimum value detected by the maximum value/minimum value detection section from the data in the block; and

a quantization section for obtaining an encoded digital signal by quantizing the minimum value-removed data generated by the generation

section, by using a quantization step determined in accordance with the dynamic range detected by the dynamic range detection section.

87. The apparatus for processing the signal according to claim 80, wherein the analog distortion occurs when a high-frequency component is removed in digital-to-analog conversion.

88. The apparatus for processing the signal according to claim 80, wherein the analog distortion occurs when a signal is shifted in phase in the digital-to-analog conversion.

89. The apparatus for processing the signal according to claim 80, wherein the digital signal is a digital image signal.

90. The apparatus for processing the signal according to claim 80, wherein the digital signal is a digital audio signal.

91. An apparatus for processing a signal comprising:

receiving means for receiving encoded data;

data-decoding means for obtaining decoded data by performing decoding processing on the received encoded data;

signal-deteriorating factor generation means for generating a signal-deteriorating factor in the decoded data in accordance with the decoded data; and

data-encoding means for obtaining encoded data by performing encoding processing on data in which the signal-deteriorating factor is generated so that signal deterioration may be promoted in accordance with the signal-deteriorating factor.

92. A method for processing a signal comprising:

a receiving step of receiving encoded data;

a data-decoding step of obtaining decoded data by performing decoding processing on the received encoded data;

a signal-deteriorating factor generation step of generating a signal-deteriorating factor in the decoded data in accordance with the decoded data; and

a data-encoding step of obtaining encoded data by performing encoding processing on the data in which the signal-deteriorating factor is generated so that signal deterioration may be promoted in accordance with the signal-deteriorating factor.

93. The method for processing the signal according to claim 92, wherein the encoded data that is received in the receiving step is encoded digital data and the data-decoding step is provided to obtain a decoded digital signal by performing decoding processing on the encoded digital signal;

wherein the signal-deteriorating factor generation step includes:

a digital-to-analog conversion step of obtaining an analog signal containing analog distortion by performing digital-to-analog conversion processing on the decoded digital signal obtained by the data-decoding step; and

an analog-to-digital conversion step of obtaining a digital signal by performing analog-to-digital conversion processing on the analog signal obtained by the digital-to-analog conversion step;

wherein the data-encoding step includes an encoding step of obtaining an encoded digital signal by performing encoding processing on the digital signal obtained by the analog-to-digital conversion step; and

wherein the encoding processing performed by the encoding step promotes deterioration in the encoded digital signal owing to an influence of the analog distortion on the digital signal.

94. An apparatus for decoding data encoded by an encoding apparatus including a signal-deteriorating factor generation section that generates a factor for deteriorating a signal, the apparatus comprising:

a receiving section that receives encoded data; and

a data-decoding section that obtains decoded data by performing decoding processing on the received encoded data in accordance with the generated signal-deteriorating factor so as to promote signal deterioration.

95. The apparatus for decoding data according to claim 94, the apparatus decoding an encoded digital signal in which a signal-deteriorating factor is generated and which is obtained by performing block encoding on data of each of the blocks obtained by performing blocking on a digital signal, the blocking being accompanied by shuffling in such a predetermined pattern as to reduce a correlation between adjacent items of data,

wherein the data-decoding section includes:

a block-decoding section for performing block-decoding processing on the encoded digital signal; and

an inverse blocking section for performing de-shuffling and inverse blocking on the data of each of the blocks obtained by the block-decoding section.

96. The apparatus for decoding data according to claim 94, the apparatus decoding encoded data in which a signal-deteriorating factor is generated and which is obtained by performing orthogonal transformation

on image data of each of the blocks obtained by dividing the image data into two-dimensional blocks, performing quantization on a conversion coefficient of each of the blocks obtained by this orthogonal transformation, and removing the conversion coefficient of a high-range frequency domain in a predetermined block before or after this quantization,

wherein the data-decoding section includes:

an inverse quantization section for performing inverse quantization on the encoded data;

an inverse orthogonal transformation section for obtaining the image data by performing inverse orthogonal transformation on the conversion coefficient of each of the blocks from the inverse quantization section; and

a conversion coefficient interpolation section for interpolating the conversion coefficient of the high-range frequency domain in the predetermined block by using the conversion coefficients of the high-range frequency domain of a block located in the vicinity of the predetermined block on the side of an input or an output of the inverse quantization section.

97. The apparatus for decoding data according to claim 96, wherein the encoded data is obtained by performing variable-length encoding on quantized data of each of the blocks obtained by the quantization; and

wherein the apparatus further comprises a decoding section for performing variable-length decoding on the encoded data, on the side of the input of the inverse quantization section.

98. An apparatus for decoding data encoded by an encoding apparatus including a signal-deteriorating factor generation section that generates a factor for deteriorating a signal, the apparatus comprising:

receiving means for receiving the encoded data; and

data-decoding means for obtaining decoded data by performing decoding processing on the received encoded data in accordance with the generated signal-deteriorating factor so as to promote signal deterioration.

99. A method for decoding data encoded by an encoding method comprising a signal-deteriorating factor generation step that generates a factor for deteriorating a signal, comprising:

a receiving step of receiving the encoded data; and

a data-decoding step of obtaining decoded data by performing decoding processing on the received encoded data in accordance with the generated signal-deteriorating factor so as to promote signal deterioration.

100. The method for decoding the data according to claim 99, the method decoding an encoded digital signal in which a signal-deteriorating factor is generated and which is obtained by performing block encoding on data of each of the blocks obtained by performing blocking on a digital signal, the blocking being accompanied by shuffling in such a predetermined pattern as to reduce a correlation between adjacent items of data,

wherein the data-decoding step includes:

a block-decoding step of performing block-decoding processing on the encoded digital signal; and

a deblocking step of performing de-shuffling and inverse blocking on the data of each of the blocks obtained by the block-decoding step.

101. The method for decoding the data according to claim 99, the method decoding encoded data in which a signal-deteriorating factor is generated and which is obtained by performing orthogonal transformation on image data of each of the blocks obtained by dividing the image data into two-dimensional blocks, performing quantization on a conversion coefficient of each of the blocks obtained by this orthogonal transformation, and removing the conversion coefficient of a high-range frequency domain in a predetermined block before or after this quantization,

wherein the data-decoding step includes:

an inverse quantization step of performing inverse quantization on the encoded data;

an inverse orthogonal transformation step of obtaining the image data by performing inverse orthogonal transformation on the conversion coefficient of each of the blocks obtained by performing the inverse quantization in the inverse quantization step; and

a conversion coefficient interpolation step of interpolating the conversion coefficient of the high-range frequency domain in the predetermined block by using the conversion coefficients of the high-range frequency domain of a block located in the vicinity of the predetermined block before or after performing inverse quantization in the inverse quantization step.

102. An apparatus for decoding encoded data, comprising:

a receiving section that receives the encoded data;

a signal-deteriorating factor generation section that generates a signal-deteriorating factor in the received encoded data in accordance with this encoded data; and

a data-decoding section that obtains decoded data by performing decoding processing on the data in which the signal-deteriorating factor is generated so as to promote signal deterioration in accordance with the signal-deteriorating factor.

103. The apparatus for decoding the data according to claim 102, the apparatus decoding an encoded digital signal obtained by performing block-encoding on data of each of the blocks obtained by performing blocking on a digital signal, the blocking being accompanied by shuffling in such a predetermined pattern as to reduce a correlation between adjacent items of data,

wherein the signal-deteriorating factor generation section includes:

a block-decoding section for performing block-decoding processing on the encoded digital signal; and

a de-shuffling section for de-shuffling data of each of the blocks obtained by the block-decoding section; and

wherein the data-decoding section includes an inverse blocking section for performing inverse blocking in accordance with the de-shuffled data.

104. The apparatus for decoding the data according to claim 102, the apparatus decoding encoded data obtained by performing orthogonal transformation on image data of each of the blocks obtained by dividing the image data into two-dimensional blocks and quantizing a conversion coefficient of each of the blocks obtained by this orthogonal transformation,

wherein the signal-deteriorating factor generation section includes:

an inverse quantization section for performing inverse quantization on the encoded data;

an inverse orthogonal transformation section for obtaining the image data by performing inverse orthogonal transformation on the conversion coefficient of each of the blocks from the inverse quantization section; and

a conversion coefficient acquisition section for acquiring the conversion coefficient of a high-range frequency domain in the predetermined block in accordance with the conversion coefficients of the high-range frequency domain of a block located in the vicinity of the predetermined block on the side of an input or an output of the inverse quantization section; and

wherein the data-decoding section uses the conversion coefficient of the high-range frequency domain in the block located in the vicinity of the predetermined block as the conversion coefficient of the high-range frequency domain in the predetermined block.

105. An apparatus for decoding encoded data, comprising:

receiving means for receiving the encoded data;

signal-deteriorating factor generation means for generating a signal-deteriorating factor in the input encoded data in accordance with the data obtained by decoding processing; and

data-decoding means for obtaining decoded data by performing decoding processing on the data in which the signal-deteriorating factor is generated so as to promote signal deterioration in accordance with the signal-deteriorating factor.

106. A method for decoding encoded data, comprising:

a receiving step of receiving the encoded data;

a signal-deteriorating factor generation step of generating a signal-deteriorating factor in the input encoded data in accordance with this encoded data; and

a data-decoding step of obtaining decoded data by performing decoding processing on the data in which the signal-deteriorating factor is generated so as to promote signal deterioration in accordance with the signal-deteriorating factor.

107. The method for decoding the data according to claim 106, the method decoding an encoded digital signal obtained by performing block encoding on data of each of the blocks obtained by performing blocking on a digital signal, the blocking being accompanied by shuffling in such a predetermined pattern as to reduce a correlation between adjacent items of data,

wherein the signal-deteriorating factor generation step includes:

a block-decoding step of performing block-decoding processing on the encoded digital signal; and

a de-shuffling step of de-shuffling data of each of the blocks obtained by the block-decoding step; and

wherein the data-decoding step includes an inverse blocking step of performing inverse blocking in accordance with the de-shuffled data.

108. The method for decoding the data according to claim 106, the method decoding encoded data obtained by performing orthogonal transformation on image data of each of the blocks obtained by dividing the image data into two-dimensional blocks and quantizing a conversion coefficient of each of the blocks obtained by this orthogonal transformation,

wherein the signal-deteriorating factor generation step includes:

an inverse quantization step of performing inverse quantization on the encoded data;

an inverse orthogonal transformation step of obtaining the image data by performing inverse orthogonal transformation on the conversion coefficient of each of the blocks from the inverse quantization step; and

a conversion coefficient acquisition step of acquiring the conversion coefficient of a high-range frequency domain in the predetermined block in accordance with the conversion coefficients of the high-range frequency domain of a block located in the vicinity of the predetermined block on the side of an input or an output of the inverse quantization step; and

wherein the data-decoding step uses the acquired conversion coefficient of the high-range frequency domain in the block located in the vicinity of the predetermined block as the conversion coefficient of the high-range frequency domain in the predetermined block.